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EGON G. GUBA.....*Editor*
SHIRLEY LIPSON.....*Associate Editor*

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CONTENTS

The Effects of Television Teaching on the Classroom Teacher..... 141
ROBERT E. JEWETT

Sample Frequency in Application of Dale-Chall Readability Formula..... 146
MAVIS MARTIN AND WAYNE LEE

An Attempt to Shorten the Word List with the Dale-Chall Readability Formula..... 150
PATRICIA NYMAN, BRYANT E. KEARL, AND RICHARD D. POWERS

Editorial Comment
Measuring the Effectiveness of Instructional Television..... 153

The Editor Retires..... 161

Readings..... 163
The Years of Youth: Kent State University, 1910–1960; Rethinking Science Education; Literature Study in the High Schools; Focus on Values in Elementary Education; Education and Manpower; Guidance: A Developmental Approach.

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Educational Research Bulletin

SEPTEMBER 13, 1961
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The Effects of Television Teaching on the Classroom Teacher

By ROBERT E. JEWETT

Mr. Jewett is professor of education at Ohio State University.

NOTE.—As the Midwest Program on Airborne Television Instruction gets under way (see the complete telecasting schedule on pages 154-55), the need for comprehensive evaluation becomes urgent. Much of this research can be done by individual school systems. This month's "Editorial Comment" features a discussion of research techniques that they can apply in evaluating the effects of MPATI in their local situations. In the article that follows, Mr. Jewett raises a number of significant questions in respect to one phase of television instruction that still requires a great deal of research effort.

EVEN the most enthusiastic advocates of direct television teaching assure us that the television teacher will never replace the classroom teacher. We are told that the role of the latter will be modified but that he will continue to be a key figure in promoting pupil growth. Indeed, rather than make the classroom teacher obsolete, television teaching will enable him to function more effectively. Freed from certain of his present responsibilities, he will be able to concentrate on achieving the highly important goals which his professional skills and his strategic position in the educational system make possible for him, and only him, to achieve.

In describing the respective roles of the television teacher and the classroom teacher, I. Keith Tyler emphasizes the important place that the latter will have in a program of direct television teaching:

It must always be remembered, however, that direct teaching by television is by no means the whole of teaching. It is simply the presentation part of teaching—the telling and showing. It can help

in motivating learners; it can expound ideas and concepts and develop them logically; it can present models to be emulated; it can raise questions and pose problems; and it can provide some drill. But it cannot study individual learners and their interests and needs; it cannot provide individual and group activities; it cannot appraise individual progress; it cannot counsel and advise boys and girls with special problems; it cannot provide laboratory experience; it can do little toward the development of creativity and inventiveness; and it cannot provide much practice in applying principles, gathering data, and handling group problems democratically. Indeed, most of the learning activities necessary to achieve significant educational objectives take place under the guidance of the classroom teacher or are handled by exceptionally mature students on their own.[1]

Since the classroom teacher has an essential role in the overall program of direct television teaching, it is important that we know its effects upon him. If the program lowers his morale, destroys his sense of professional identity, and creates within him a sense of alienation,[2] then, to a degree at least, it will be self-defeating. If, however, it raises his morale, enhances his sense of professional identity, and creates within him a feeling of satisfaction, then the probability of its success will be increased.

In general terms, therefore, we need to know whether participation in such a program gives the classroom teacher a sense of alienation or satisfaction. Does it make him feel powerless to achieve the role of teacher as he has come to define it? Or does it give him a sense of professional satisfaction or fulfillment? Possibly participation will have no appreciable effect on his sense of professional identity.

In more specific terms, we need to know what elements of alienation and satisfaction the classroom teacher experiences. Does participation result in a sense of powerlessness or powerfulness, of meaninglessness or meaningfulness, of purposelessness or purposefulness, of isolation or belongingness, of self-estrangement or self-fulfillment?[3] Furthermore, we need to know to what degree these elements are experienced.

[1] "Television Frees the Teacher," EDUCATIONAL RESEARCH BULLETIN, XXXIX (October, 1960), pp. 177–78.

[2] The term "alienation" is here used as defined by John P. Clark ("Measuring Alienation within a Social System," *American Sociological Review*, XXIV, December, 1959, p. 849): "Alienation is the degree to which man feels powerless to achieve the role he has determined to be rightfully his in specific situations" (italics omitted).

[3] This breakdown of the concept of alienation is taken with modifications from Melvin Seeman ("On the Meaning of Alienation," *American Sociological Review*, XXIV, December, 1959, pp. 783–91).

Direct television teaching introduces a new factor into the interpersonal relations involved in the teaching-learning process—the television teacher. How will his presence affect the classroom teacher's sense of professional satisfaction? This is a complex question, involving, among other things, the teacher's attitude toward educational television and his conception of his own role.

The classroom teacher who thinks of direct television teaching as a significant educational undertaking and himself as an important part of it will probably welcome the television teacher. He may see his own stature increase in the eyes of his pupils, especially as he explains and expands the presentation of the television teacher. Or he may fear the television lesson, thinking that his pupils will regard his colleague on television as the authority and consequently downgrade his own status.

Of extreme importance is the way in which the classroom teacher defines his function in relation to that of the television teacher. Briefly, the latter's function is to present the content of a given course at a standardized pace. Since he selects materials and areas of emphasis, he will, to a large extent, determine the purpose of the course.

The classroom teacher may think that the framework of television teaching is too confining, too inflexible. He may view the program as a lock-step system in which he lacks freedom to determine the pace and the emphasis of instruction in his course. For example, he may believe that a particular topic, because of its inherent importance or difficulty or because of the high degree of interest that it has aroused in the class, warrants more time than he can spend if he is to remain in step with the television presentation. He may think that another topic is being given too much time. Conceivably he may resent the amount of control that the television teacher has.

The very idea of having the television teacher present content is still another issue. The classroom teacher may believe that divorcing this element from the remainder of the teaching act creates a false dichotomy between content and the methods used to develop pupils intellectually, morally, and esthetically. He may think that this development can occur only when thought, values, and appreciations are grounded in content and that to assign the television teacher the role of presenting content and the classroom teacher the responsibility of promoting the development of these other vital areas is to overlook the natural relationship.

Therefore, he may reject the program on the ground that it is based on unsound psychological and philosophical premises.

On the other hand, the classroom teacher may react quite favorably toward direct television teaching. He may welcome it as an aid in "covering the ground": the schedule maintained by the television teacher will assist him in teaching a given amount of predetermined material within a prescribed time. His function, then, is to transform the content presented by the television teacher into material that will promote the total development of his pupils.

These are some of the general reactions that the classroom teacher exposed to television instruction may experience. When one considers specific categories of teachers, the issues that need to be examined become more clear-cut.

For one thing, we need to know whether elementary- and secondary-school teachers are affected in the same manner by direct television teaching. The secondary-school teacher's traditional emphasis upon content, for example, will probably influence his reaction toward the television teacher, whose major function is to present content. The classroom teacher may think that he is being recast in an unscholarly role. Or he may think that his effectiveness will be increased by his affiliation with an undertaking which can purvey content to his pupils better than he.

Since many secondary-school teachers rely heavily on a basic textbook, they may believe that the television teacher's presentation constitutes an unnecessary or undesirable duplication of, or substitution for, the textbook. Furthermore, since a program of direct television teaching which involves more than one school system cannot be designed to supplement or reinforce the textbook, particularly if the various systems use different books, unplanned duplication and problems of course organization may arise. The teacher who places less emphasis on the textbook may react favorably to the program. He is more likely to rely on collateral reading and audio-visual materials to supplement the televised presentation. The science teacher, for example, may welcome the presentation of experiments and demonstrations that are not easily arranged in the classroom. In subjects in which the textbook rapidly becomes out-of-date—problems of democracy courses, for example—the teacher may be glad to have this means of updating the material.

The elementary-school teacher will have other concerns. Since one of the major values claimed for the self-contained classroom in the elementary school is that pupils are required to adjust to only one teacher, the teacher may be disturbed by the introduction of an additional person—the television teacher—into the teaching situation. This would be particularly true if a class is scheduled to take part in two or more series of television lessons, each taught by a different television teacher. On the other hand, the teacher may see himself as retaining over-all control of the class. Indeed, he may see before him an opportunity to help his pupils adjust to a widening circle of instructional personnel.

Factors other than the school level are likely to affect teachers' attitudes toward television instruction. For example, will teachers employed in rural, village, and city schools react in the same manner? A teacher in a city school system may tend to be influenced less by the local community's image of the teacher and more by his colleagues—both in his school and in the profession—than is the rural or village teacher.

School size may be a very important factor. Will teachers employed in small schools react in the same way as those in large schools? The secondary teacher in the small school, for example, tends to teach a greater variety of subjects than his counterpart in the large school. Often he is called upon to teach subjects for which he has very little preparation. On the one hand, he may welcome direct television teaching in those subjects in which he has the least background. He may think that if the television teacher is responsible for presentation of content in certain subjects, he will be free to concentrate on that portion of his assignment in which he is best qualified. On the other hand, since he must teach subjects for which he is poorly prepared, he may see the television teacher as a threat to his security. Unable to explore adequately the material presented by the television teacher, he may feel that he has been placed in an untenable position.

The teacher in a large school may react unfavorably for different reasons. If he believes that he is fully competent to present content to his pupils, he may resent the television teacher's assuming this function. But if he thinks that television teaching offers the most effective manner of presenting content, he may see his function as that of enhancing the presentation of the television teacher so that it has maximum meaning for his pupils.

[*Continued on page 168*]

Sample Frequency in Application of Dale-Chall Readability Formula

By MAVIS MARTIN AND WAYNE LEE

Mrs. Martin is assistant director of the Reading Center at Oklahoma State University. Mr. Lee is an instructor in elementary education at Central State College in Oklahoma.

EVERY readability formula offers recommendations concerning sampling techniques, but there has been very little research to support the use of any particular procedure. There is need especially for research concerning the frequency of sampling which will yield dependable results in the shortest amount of time. The enormity of the task as suggested by most formulas is a barrier to both research and application. It seems useful, therefore, to discover if a procedure using a sample taken at less frequent intervals than one established by a selected formula will yield a dependable readability index.

The purpose of this study was to determine if a more efficient sampling technique could be reliably employed. The specific question was: Will samples taken at 50-page intervals in high-school biology textbooks yield as dependable grade-placement indexes as samples taken at 10-page intervals in the same material? The writers' hypothesis was that there is no significant difference between the mean-index scores of material taken at 50-page intervals and the mean-index scores of material taken at 10-page intervals from the same textbooks.

After due consideration of appropriate formulas, the Dale-Chall Readability Formula was selected for this study as representative of the best achievements in this area. Materials selected for evaluation were the five high-school biology textbooks adopted for use in Oklahoma.[1]

The authors of the readability formula describe a sample as consisting of approximately 100 words, but never beginning or ending in the middle of a sentence.[2] In this study the samples

[1] Baker, Arthur O., *et al. New Dynamic Biology.* New York: Rand McNally and Company, 1959; Dodge, Ruth A. *Elements of Biology.* Revised edition. Boston: Allyn and Bacon, Inc., 1959; Kroeber, Elsbeth, *et al. Biology.* Boston: D. C. Heath and Company, 1960; Moon, T. J., *et al. Modern Biology.* New York: Henry Holt and Company, 1951; Smith, Ella T. *Exploring Biology: the Science of Living Things.* Fifth edition. New York: Harcourt, Brace and Company, 1959.

[2] Dale, Edgar, and Chall, Jeanne S., "A Formula for Predicting Readability: Instructions," EDUCATIONAL RESEARCH BULLETIN, XXVII (February 18, 1948), p. 37.

began with the first word in the first sentence of each selected page.

A sample was taken within the first 10 pages of each of the five biology textbooks. Subsequent samples were taken at each 10-page interval throughout the rest of the book. If any sample fell on a page not having passages of continuous reading matter, the next page with continuous reading matter was used.

Another sample was taken within the first 50 pages of each of the same textbooks. Subsequent samples were taken at every 50-page interval throughout the remainder of each book. Again only passages of continuous material were used as samples.

Also a sample at 50-page intervals was drawn from within the samples selected at 10-page intervals. This provided, for comparison, a sampling at 50-page intervals from within the sampling at 10-page intervals, and a sample at 50-page intervals falling in material outside the 10-page selections.

The resultant indexes, computed from the Klare table,[3] for the two samples at 50-page intervals and the samples at 10-page intervals were arranged in a frequency-distribution table. Means and standard deviations for each distribution were determined. A t test of significance was applied to indexes on each textbook used and for the five textbooks combined. The means, standard deviations, standard error of means, and the t scores are shown in Tables I, II, and III.

The null hypothesis stating that there is no significant difference between the mean-index scores of material taken at 50-page intervals and the mean-index scores of material taken at 10-page intervals from the same textbook cannot be rejected. The difference is not significant whether the sampling at 50-page intervals is from within or outside the material used in the sampling at 10-page intervals. When samples taken at 10-page intervals from the five textbooks are combined and compared with samples taken at 50-page intervals from all five textbooks, again no significant difference is found. In addition, when samples at 50-page intervals taken from within the 10-page sampling are compared with samples at 50-page intervals taken outside the 10-page sampling, there is no significant difference. Results of this study indicate, therefore, that samples taken at 50-page intervals from high-school biology textbooks yield as dependable a grade-placement index as those taken at 10-page intervals.

[3] Klare, George R., "A Table for Rapid Determination of Dale-Chall Readability Scores," EDUCATIONAL RESEARCH BULLETIN, XXXI (February 13, 1952), pp. 43–47.

TABLE I

Comparison of 10-page Interval Samples with 50-page Interval Samples outside 10-page Sampling

Samples	10-page Intervals				50-page Intervals Outside 10-page Sampling				t
	N	Mean	S.D.	S.E.$_m$	N	Mean	S.D.	S.E.$_m$	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Book A	67	7.66	1.156	.141	14	7.40	.783	.209	1.083
Book B	57	7.87	1.004	.132	11	7.58	1.070	.323	.828
Book C	70	7.99	.029	.004	14	8.08	1.180	.327	.275
Book D	68	7.45	.695	.091	13	7.64	1.150	.332	.552
Book E	59	7.14	.917	.119	12	6.84	.806	.243	1.149
All Textbooks	321	7.62	1.100	.006	64	7.52	1.110	.019	.662

TABLE II

Comparison of 10-page Interval Samples with 50-page Interval Samples within 10-page Sampling

Samples	10-page Intervals				50-page Intervals within 10-page Sampling				t
	N	Mean	S.D.	S.E.$_m$	N	Mean	S.D.	S.E.$_m$	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Book A	67	7.66	1.156	.141	14	7.82	.861	.238	.577
Book B	57	7.87	1.004	.132	11	7.70	1.090	.345	.459
Book C	70	7.99	.029	.004	14	8.32	1.110	.297	1.111
Book D	68	7.45	.695	.091	14	7.53	1.160	.310	.249
Book E	59	7.14	.917	.119	12	6.88	.719	.149	1.087
All Textbooks	321	7.62	1.100	.006	65	7.69	1.300	.025	.409

THE results raise several questions. For publication and instructional purposes, will not the application of the Dale-Chall Readability Formula using samples taken at 50-page intervals rather than at the suggested 10-page intervals yield dependable results in biology textbooks? Will it do so in other content areas?

TABLE III

COMPARISON OF 50-PAGE SAMPLES IN TEXTBOOKS

50-PAGE INTERVALS OUTSIDE 10-PAGE SAMPLING				50-PAGE INTERVALS WITHIN 10-PAGE SAMPLING				t
N	Mean	S.D.	S.E.$_m$	N	Mean	S.D.	S.E.$_m$	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
64	7.52	1.11	.019	65	7.69	1.30	.025	.128

Also is there a relationship between number of samples necessary for a dependable index and length of the material being evaluated? In other words, perhaps ratio of sample to total length is relevant. It should be determined if this ratio is as important as content area in validating results.

Questions have been raised concerning the validity of the formula when applied to content areas other than that used for original validation. Miss Chall suggests that the formula needs additional verification in new kinds of materials. A more efficient sampling technique should encourage additional work in this direction.

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ANTIOCH College, long known for its work-study plan, has been testing the use of independent study as a part of regular teaching since 1956. It was hoped that the assumption of greater responsibility by the students would have a twofold advantage: to increase the quality of education and to save instructional time.

The Office of Educational Research at Antioch reports that students learned equally well whether they studied under the traditional method or the experimental method, that retention among the two groups was similar, and that independent study need not be limited to superior or advanced students. Although little instructional time was saved because of the additional time needed to prepare lesson material, most instructors have indicated satisfaction with the independent-study procedures.

An Attempt to Shorten the Word List with the Dale-Chall Readability Formula

By PATRICIA NYMAN, BRYANT E. KEARL, AND RICHARD D. POWERS

Miss Nyman is a member of the Office of Information of Oregon State University. Mr. Kearl and Mr. Powers are in the Department of Agricultural Journalism, University of Wisconsin.

THE high precision and predictive power of the Dale-Chall Readability Formula make it statistically better than other formulas; its use is especially recommended in situations requiring precise measurement.[1] Probably the greatest block to wider use of the formula is the need to refer to a list of 3,000 words in determining the vocabulary burden of a piece of writing. Since there are other formulas that will do the job without reference to such a list, many potential users will turn away from the Dale-Chall formula.

If the word list could be shortened, the writers reasoned, possibly the formula would not appear so formidable and would gain wider acceptance. This paper reports an attempt to shorten the list in a systematic manner and to assess the effect of this shortening on precision and predictive power.

Two types of word lists have been developed—one includes words compiled on the basis of frequency of appearance in literature; the second is made up of words actually tested for familiarity to readers of a specific age group. The word list used with the Dale-Chall formula was tested for difficulty with fourth-grade children.

Frequency lists are used for estimating difficulty on the assumption that there is a direct correlation between the frequency of words and their familiarity to a reader: the more often a word appears in literature, the more familiar it will be to readers. Consequently, the more unfamiliar words there are in a particular piece of writing, the more difficult that writing will be.

Use of tested word lists does not rest on such an assumption. Moreover, research by E. W. Dolch cast doubt on this premise

[1] *See* Dale, Edgar, and Chall, Jeanne S., "A Formula for Predicting Readability," and "A Formula for Predicting Readability: Instructions," EDUCATIONAL RESEARCH BULLETIN, XXVII (January 21 and February 18, 1948), pp. 11–20, 28; 37–54; and Powers, R. D., *et al.*, "A Recalculation of Four Adult Readability Formulas," *Journal of Educational Psychology*, XLIX (April, 1958), pp. 99–105.

and indicated that results of tested word knowledge are far different from the results of frequency word counts.[2] For example, familiar words such as *campfire, folks,* and *mailman* do not appear on the Thorndike-Lorge list of 30,000 most frequent words,[3] though they tested as familiar and are included in Dale's list. Some very frequent words do not appear on the Dale list; examples are *claim, travel, human,* and *native.*

THE writers attempted to shorten the 3,000-word list by culling out words which, according to the Thorndike-Lorge list, do not appear very frequently in literature. Only Dale words

TABLE I

STANDARD ERRORS AND COEFFICIENTS OF MULTIPLE DETERMINATION FOR SIX READABILITY FORMULAS

Formula	Formula Error (S)	Predictive Power (R^2)
(1)	(2)	(3)
With 920-word list*	.94	.34
With 920-word list* (duplications not counted)	.94	.35
Dale-Chall†	.77	.51
Flesch Reading Ease†	.85	.40
Gunning Fog Index†	.90	.34
Farr-Jenkins-Paterson†	.90	.34

* Two methods of word counting were used: first, the writers counted every time a nonlisted word appeared in a passage; then, only the first appearance of each nonlisted word.

† These formulas were recalculated by Powers, Sumner, and Kearl, *op. cit.*

which were also among the 1,037 most frequent Thorndike-Lorge words (the Thorndike-Lorge "AA" group) were retained for a new list of 920 words.[4] These were the *best understood* according to Dale's testing and also the *most frequently used* according to the Thorndike-Lorge tabulations.

Next a readability formula was developed for the new list. Regression statistics were applied to the McCall-Crabbs graded test passages in reading,[5] to provide the criterion. The results of these computations appear in Table I.

[2] "Tested Word Knowledge vs. Frequency Counts," *Journal of Educational Research,* XLIV (February, 1951), pp. 457–70.

[3] Thorndike, Edward L., and Lorge, Irving. *The Teachers' Word Book of 30,000 Words.* New York: Bureau of Publications, Teachers College, Columbia University, 1944.

[4] Copies of this list are available from the Department of Agricultural Journalism at the University of Wisconsin.

[5] McCall, William A., and Crabbs, Lelah Mae. *Standard Test Lessons in Reading.* New York: Bureau of Publications, Teachers College, Columbia University, 1950.

The formula-error terms indicate the precision of readability estimates made by the formulas—that is, how closely each formula predicts the "true" value. The true difficulty (if it could be determined) is somewhere between the formula score plus one error and the formula score minus one error two-thirds of the time. In other words, if the formula with the 920-word list yielded a difficulty score of 4.00, it would be fairly certain that the true difficulty of the tested material was somewhere between 3.06 (4.00−0.94) and 4.94 (4.00+0.94). The same score derived from a Dale-Chall formula would have a smaller range of error—between 3.23 (4.00−0.77) and 4.77 (4.00+0.77).

The predictive-power terms of Table I tell how powerful the prediction is. The measurements made in computing formulas explain only a part of the variation in difficulty among passages tested. Some of the difficulty cannot be accounted for with the measurements made by the writers. The figures in the table indicate the percentage of difficulty variation which is explained—34 per cent in the case of the 920-word formula. Thus, considerably more of the "reasons" for difficulty are left unexplained than in the case of the Dale-Chall formula with a predictive power of 51 per cent.

Clearly the formula used with the 920-word list had lower predictive power and a larger error term on the McCall-Crabbs passages than either the Dale-Chall or the Flesch formula. However, it was about equal to the Farr-Jenkins-Paterson formula and the Gunning Fog Index in both predictive power and error.

Thus, this attempt at shortening the Dale list proved unsuccessful: the loss in precision and predictive power was too great. Other schemes for shortening the list ought to be tried. Until a more suitable one is developed, however, the Dale list should continue to be used in its present form.

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EDITORIAL COMMENT

Measuring the Effectiveness of Instructional Television[1]

IN JULY, 1960, I had the opportunity to address a workshop on the subject, "Evaluation and the Airborne Television Project." At that time I listed seven reasons why there was an urgent need for an intensive evaluation of the MPATI project.[2] During the intervening year, I have witnessed, and sometimes been party to, a great deal of activity nominally aimed at achieving a reasonable evaluation program, but this activity has up to now been largely unproductive. There have been three separate movements:

1. *Activities directly initiated by the MPATI central staff.* The original funding of the MPATI Program made no provision for a central evaluation. Nevertheless, a research and evaluation staff was established and has worked for most of this year in delineating the particular problems and questions which the central staff regards as crucial and in planning specific procedures.

Just before press time the MPATI staff agreed to support a proposal submitted by Egon Guba and I. Keith Tyler, of Ohio State. This proposal sets up evaluative research in two areas: (1) the impact of television teaching upon the role of the classroom teacher, and (2) the economic efficiency of televised instruction. A committee representing several departments of Ohio State University, as well as the Divisions of Research of the State Department of Education and the Ohio Education Association, drafted the proposal and will take the responsibility for its implementation. Further details will follow in the next issue of the Bulletin.

Despite this effort, the direction of work thus far indicates that MPATI will rely on local evaluations, doing what it can to help the local school staffs undertake sound studies. I venture to say that the materials which the project will provide—evaluation manuals, tests on each of the MPATI course series, and so on—will be concerned largely with testing information.

2. *Activities promoted by various state agencies.* The Michigan Association for Supervision and Curriculum Development

[1] Adapted from an address presented at workshops on the Midwest Program on Airborne Television Instruction, Wittenberg University, June 27, 1961, and Ohio State University, June 29, 1961.

[2] *See* EDUCATIONAL RESEARCH BULLETIN, XXXIX (October 12, 1960), pp. 179–93.

Midwest Program on Airbo
Broadcast Schedule—September

EST	Monday		Tuesday	
	72	76	72	76
9:00 to 9:30	Modern Chemistry College and Advanced High School	Biology College and Advanced High School	Modern Chemistry College and Advanced High School	Biology College and Advanced High School
9:35 to 9:55	Arithmetic Grade 6	Music Grades 1–3	Arithmetic Grade 6	Music Grades 4–6
10:00 to 10:30	Modern Algebra College and Advanced High School	American History Senior High School	Modern Algebra College and Advanced High School	American History Senior High School
10:35 to 10:55	Science Grades 3–4	Science Grades 5–6	Science Grades 3–4	Science Grades 5–6†
11:00 to 11:30	Russian College	American Government Senior High School	Russian College†	American Government Senior High School
11:35 to 11:55	Spanish Grades 3–6	French Grades 3–6	Spanish Grades 3–6	French Grades 3–6
12:00 to 12:30	World History Senior High School	General Science Junior High School	World History Senior High School	General Science Junior High School†
12:35 to 12:55	Arithmetic for Gifted Children Grades 5–6	Arithmetic Grade 6	Arithmetic for Gifted Children Grades 5–6†	Arithmetic Grade 6
1:00 to 1:30	World History Senior High School	English Language Arts Grades 3–4 (20 minutes)	World History Senior High School	Teacher Education
1:35 to 2:05	American History Senior High School	Music Grades 1–3 (20 minutes)	American History Senior High School	Materials

* Telecasts are simultaneous on UHF Channels 72 and 76. The daily schedule starts with a five-
† Repeat of telecast from previous day.

Airborne Television Instruction
tember 11, 1961-January 25, 1962*

	Wednesday		Thursday		
	72	76	72	76	CST
nd High	Modern Chemistry College and Advanced High School	Biology College and Advanced High School	Modern Chemistry College and Advanced High School	Biology College and Advanced High School	8:00 to 8:30
-6	Arithmetic Grade 6	Music Grades 1–3	Arithmetic Grade 6	Music Grades 4–6	8:35 to 8:55
listory gh	Modern Algebra College and Advanced High School	American History Senior High School	Modern Algebra College and Advanced High School	American History Senior High School	9:00 to 9:30
-6†	Science Grades 3–4	Science Grades 5–6	Science Grades 3–4	Science Grades 5–6†	9:35 to 9:55
Govern- igh	Russian College	American Government Senior High School	Russian College†	American Government Senior High School	10:00 to 10:30
-6	Spanish Grades 3–6	French Grades 3–6	Spanish Grades 3–6	French Grades 3–6	10:35 to 10:55
ence igh	World History Senior High School	General Science Junior High School	World History Senior High School	General Science Junior High School†	11:00 to 11:30
	Arithmetic for Gifted Children Grades 5–6	Arithmetic Grade 6	Arithmetic for Gifted Children Grades 5–6†	Arithmetic Grade 6	11:35 to 11:55
	World History Senior High School	English Language Arts Grades 3–4 (20 minutes)	World History Senior High School	Teacher Education	12:00 to 12:30
	American History Senior High School	Music Grades 1–3 (20 minutes)	American History Senior High School	Materials	12:35 to 1:05

h a five-[illegible] test pattern and includes five-minute station breaks between telecasts.

has planned a series of workshops designed to develop criteria for evaluation, to assist in the development of techniques necessary for assessing MPATI programs in the light of these criteria, and to share any data that might emerge from local studies. The Executive Committee of the Indiana ASCD is moving toward a similar program. In Ohio, staff personnel of the Ohio Education Association, the State Department of Education, the Ohio State University Bureau of Educational Research and Service and Department of Education, and the University's MPATI field representatives have begun informal conversations to see what might be done in this state. It is too early to assess the effectiveness of these efforts, but it is clear that they cannot be successful without the complete co-operation of a wide sampling of local school systems, administrators, and teachers.

3. Activities proposed as research ventures to funding agencies other than those already supporting MPATI. The MPATI central research and evaluation staff has supported the development and submission of proposals by independent investigators to funding agencies like the New Media Branch in the U. S. Office of Education, popularly known as the Title VII Branch. Several such proposals have been submitted, but so far as I know, none has been accepted. Whether this is because they were uniformly bad or because there is a reluctance of one agency to support an evaluation of another agency's program, I cannot say.

It seems, then, that no successful program of evaluation has been made operational. Moreover, it now seems unlikely that such a program will emerge unless local school systems undertake the responsibility for fashioning and executing their own programs. It is my contention that a great many respectable research inquiries can be carried out at the local level if certain principles are kept in mind. I shall attempt to outline several such principles here. I shall base my discussion on five problems: internal and external validity, comparative data, bias, instrumentation, and analysis and interpretation.

1. The problem of internal and external validity. Generally speaking, all research is carried on in terms of variables. These are simply the dimensions which are being studied. For example, one may study the personality variables of teachers (such as honesty, forthrightness, or loyalty), the behavior patterns of teachers in the classroom, and the like. Unfortunately, the scope of any

research cannot be limited to those variables in which the researcher has interest; extraneous variables always interfere in a manner analogous to radio static. The object of the research game might be said to differentiate the variables of interest from the extraneous or "noisy" variables. The latter may be termed "confounding variables."

It is possible to deal with confounding variables in two distinct ways. One way is by means of appropriate experimental *controls*. For example, if a particular research study is likely to be influenced by the intelligence of the subjects involved, it may be possible to match subjects in terms of intelligence scores. A second way is by means of *randomization*—a statistical practice. Randomization neither eliminates nor controls confounding variables; their effects remain in force and influence the research as they normally would. The randomization process, however, provides an opportunity to assess the size of the confounding effect and to take it into consideration in making an interpretation. Since it is not physically possible within the limits of resources usually available to researchers to control all possible sources of confounding variables, every research retains some randomized variation.

An inquiry is said to have *internal validity* if (1) all confounding variables have been converted into either controlled or randomized variables and if (2) the research is designed in such a way that it is possible to make an estimate of the size of the random variation so that the experimental variables may be tested against it (that is, compared to it) for significance. In the social sciences these conditions are almost impossible to accomplish rigorously; hence, internal validity is almost always in question. The important thing is not that airtight control be achieved but that the places where control breaks down be identified and taken into account. This can be done in the local school situation as well as anywhere.

Experiments possess *external validity* if they are conducted in such a way that the population to which the results will apply can be described *a priori*. This implies that the population has been defined before the fact and that the sample has been selected from that population by scientific probability sampling methods. Random sampling involves at least two essential elements: random *selection* from the population to which we wish to generalize the results, and random *assignment* to the experimental treatment.

In the typical school situation, it is usually possible to achieve random assignment, that is, to assign students to whatever treatment we wish. But random selection is somewhat more elusive; we must use the students that are available to us in the local situation, rather than to sample them from some larger population to which we might wish to generalize. It, therefore, becomes impossible to specify exactly to what extent the data derived in such local research are generalizable to other groups of children. While this situation obviously poses a difficult problem, it is not insurmountable. A reasonably practical solution is to collect descriptive information on the students that are available to the researcher and thus make it possible for persons in other situations to determine by a study of these descriptive data whether or not the students experimented upon are, in fact, like the students to whom they may wish to generalize the results. Again, this is quite easy to do in the local school situation.

2. *The problem of comparative data.* Data collected in a vacuum are usually meaningless. Some reference point is needed. Practically, two rather different kinds of reference points are used. The first might be termed an "ideal" reference, the second an "empirical" reference. In some situations, it may be possible to specify in advance what it is that a group is to achieve. Indeed, this is typically done by school people whenever they set down the objectives for a course. Once such an ideal has been set up, it is possible to assess the actual performance of the group in question to see to what extent it approaches the ideal. This comparative process is usually called *evaluation*. Note that it requires a judgment of the absolute extent to which performance approaches some idealized criterion.

In other practical situations, our interest is not so much in an absolute evaluation of a single group as it is in the relative performance of two or more groups. This is true whenever two or more alternatives are to be tested against one another or when, because of an inability to specify an ideal, the performance of the experimental group has to be compared to an empirically determined "standard" or "control" group. It is in connection with this situation that research persons usually talk about "control" groups. Such control groups may take one of two forms. The experimental group may be used as its own control, as in the case in which performance after some experimental treatment is

compared with performance of the same group before the experimental treatment; this is usually called a pretest-posttest situation. Or the experimental group may be compared with an independently selected control group. In this case the experimental and control groups must be as similar as possible, and all measurement must be conducted with similar instruments under similar circumstances.

I hope it is clear that there is nothing about either evaluation or experimentation which militates against them in the local school situation.

3. The problem of bias. Suppose that an experiment or an evaluation has been designed so that conditions of internal and external validity are tolerably well met and valid comparative data are available. It may still be possible to obtain erroneous information because of biasing factors. These are factors which affect a group as a whole. For example, one group may be taught by an effective teacher, another by an ineffective teacher. Or one group may meet early in the morning when all of its members are alert while another may meet right after lunch when its members are sleepy and logy. Or, to take another example, some subjects may drop out of a group because of a biasing factor, such as ill health, and thereby essentially change its make-up. Fortunately, it is possible to anticipate these contingencies and to be prepared to deal with them. It is usually possible to rotate or to counterbalance effects that might otherwise be biasing. For example, teachers can be rotated from class to class according to a predetermined schedule so that variations in effectiveness essentially balance out. Stand-by subjects can be made available to replace persons who drop out of experimental groups. Treatments can be rotated so that if Group A studies spelling first and then geography, Group B may study geography first and then spelling, and so on. Clearly the elimination or balancing of biasing factors are not overwhelming problems.

4. The problem of instrumentation. Variables have to be measured. Indeed, the methods used to measure the variables are crucial in deciding the outcomes of the experiment and must be taken into account in any interpretation. The metrics used are generally taken as the *operational definition* of the basic variables. No study was ever done that related intelligence to school achievement; rather, one study relates Stanford-Binet I.Q.'s to

teachers' grades, another relates Otis scores to grade-point averages, and the like. Stanford-Binet I.Q.'s and Otis scores are the operational definitions of intelligence; teachers' grades or grade-point averages are the operational definitions of school achievement. Thus, the instruments used are crucial in determining the outcome and the interpretation that can be placed upon it.

The unsophisticated person engaging in research usually feels compelled to use a standardized test. Such a test is simply one that has been given to somebody. Indeed, the only real utility of a standardized test is to provide a ready-made comparison group (the norm). But if the test is operationally inadequate for the purpose or if the comparison (norm) group is inappropriate, using a standardized test just because it is standardized is an egregious error.

Among the uninitiated, the use of "objective" measures is of great concern. Interviews, observations, and essay tests are often eschewed because they cannot be "objectified." Yet an objective device is simply one that can be interpreted consistently by competent observers. I am afraid that in the public mind objectivity has been confused with structure: the highly structured multiple-choice test is said to be objective while the highly unstructured Rorschach ink-blot test is not objective. But to a competent reader, a Rorschach protocol is just as objective as any multiple-choice test. Certainly the development of relevant, objective, valid, and reliable instruments is within the capability of local school personnel.

5. *The problem of analysis and interpretation.* Analysis, in most cases, depends upon some sort of statistical manipulation. Two problems immediately arise out of this fact. First, statistics is very complicated and cannot be learned overnight. I cannot emphasize too strongly the necessity for getting sound statistical advice early in the game. Second, modern statistical analysis often requires elaborate numerical equipment, ranging from a desk calculator to electronic computers. Most schools are not equipped with even the desk calculator, let alone a 704 computer. Again, I can only say that it would be wise to consult with appropriate agencies before venturing into numerical analysis.

Can local school systems get this kind of help? Several resources are readily available. The Division of Research of the State Department of Education, headed by Robert Beynon, is one.

Another is the Research Division of the Ohio Education Association, headed by Robert Miner. Both men have assured me that they will co-operate with any local school district that asks for their help. And, of course, the Bureau of Educational Research and Service at Ohio State University offers its services also.

THE problems of conducting research and evaluation at the local level thus do not seem insurmountable—either the problems are manageable or adequate help is available. There is, however, one other matter to be considered. Research undertaken by a local school system will have no utility except within that system unless there is some way to make it public. I should like to commit the BULLETIN to publish in some form any and all research data collected in connection with the MPATI Program through local school district research which conforms to the principles of design outlined here. Information so gathered and disseminated can have a real impact both upon local school practice and the MPATI Program in general. In this way the State of Ohio can make a real contribution to the evaluation of what I consider to be the most important educational program to develop in at least two decades.

I urge every interested school system to give serious consideration to undertaking some programs of research or evaluation in connection with MPATI. You have the full support of the BULLETIN and the Bureau of Educational Research and Service. I invite your inquiries.

EGON G. GUBA

The Editor Retires

DURING most of the past two decades, the EDUCATIONAL RESEARCH BULLETIN, under the direction of R. H. Eckelberry, has witnessed a good many changes and shifts of emphasis in education. In 1943, when Mr. Eckelberry assumed the editorship of the BULLETIN, Ohio State University was initiating a large research project dealing with acceleration. Today airborne television instruction is occupying much of the thinking of educators. The education editor, hoping to interpret such important new developments and sweeping changes of emphasis, has a difficult task. It requires a broad intellectual perspective

and considerable knowledge of a wide variety of educational matters. Mr. Eckelberry has brought both of these qualities to bear upon the educational scene.

Mr. Eckelberry entered Ohio State University as a student in 1920 and earned all of his degrees here. He began teaching as a graduate assistant in the history and philosophy of education, and in 1939 was appointed professor of education. In 1943 he became editor of the *Journal of Higher Education* along with the BULLETIN; he resigned as editor of the *Journal* in 1960. During a distinguished academic career, he has been active in a number of professional organizations and honorary societies. His influence among students is evidenced by the correspondence that he still maintains with former students.

His career as conservationist is further proof of his wide-ranging interests. Since 1944 he has been a member of the staff of the Ohio Conservation Laboratory and was its director for seven years. He has also served on local and national committees to help promote conservation education.

In his capacity as editor, Mr. Eckelberry has been a key figure in the development of the publications program of the College of Education. Under his direction, the annual Bode Memorial Lectures, the School-Community Development Study Series, the resource guides by Harold Alberty, and numerous other books and pamphlets were published. Eager to improve the quality of educational writing, he has always been willing to offer advice to students and colleagues alike, and, because of his remarkable combination of personal qualities and good judgment, they have usually been willing to take his suggestions.

If one were to choose the single quality that best characterizes Mr. Eckelberry, it would seem to be integrity. It accounts for the warm personal relationships that have developed between him and his associates. It is responsible for a distinguished professional career. Never one to be cowed by authority nor to shrink from controversy, he has always stated his views forthrightly. The familiar "R. H. E." has appeared at the end of a good many pieces that a less fearless editor would not have written. His advocacy of the cadet-teaching program and the establishment of community colleges are but two examples.

In light of such an active career, retirement seems to be a relative term, a shifting of emphasis from professional duties to

[*Continued on page 168*]

READINGS

Books to Read

SHRIVER, PHILLIP R. *The Years of Youth: Kent State University, 1910–1960.* Kent, Ohio: Kent State University Press, 1960. viii + 266 pp.

This history of Kent State University was prepared in connection with that institution's semicentennial observance. The author briefly discusses the movement for the development of teacher-training institutions in Ohio, which led in 1902 to the establishment of normal schools at Ohio and Miami Universities, and in 1910 to the enactment of the Lowry Bill providing for the creation of two additional normal schools in northern Ohio. He relates the story of the selection of the village of Kent as the location for one of these, the establishment of the normal school, and its development, through many difficulties, into the present Kent State University, comprising four undergraduate colleges and a graduate school.

Few colleges or universities have had so tempestuous a history. After a quick start and a period of rapid growth, the institution encountered an unparalleled series of difficulties and crises that lasted until the early 1940's. Happily, during the last decade and a half, under President George A. Bowman, it has achieved stability, grown rapidly, extended and improved its program, and earned recognition by accrediting agencies and other institutions. It now promises to play an increasingly important part in meeting the educational needs of the state and nation.

The author has told the story of the institution without attempting to gloss over the less pleasant parts of it. His account is comprehensive and well-documented. This is a highly instructive case study in the history of higher education in the United States.

R. H. ECKELBERRY

HENRY, NELSON B., editor. *Rethinking Science Education.* Chicago: University of Chicago Press, 1960. xviii + 350 pp. (Fifty-ninth Yearbook of the National Society for the Study of Education, Part I).

The events of the last two decades have clearly demonstrated the vital importance of science to our technology, our national defense, our public health, and our whole civilization. It has become apparent to many of our citizens that now is the time to assess the role of science education in our society. Part I of the 1960 Yearbook of the National Society for the Study of Education has brought together the thinking of many dedicated scientists and science teachers on the many aspects of science education.

The authors have tried to point the directions science education must take in order to reach its full potential. The many suggestions for the

improvement of science education which have resulted will probably be the best source of inspiration for science teachers and science supervisors for years to come.

Interestingly, most of the writers indicated that an understanding of what science is and how a scientist works is one of the most important objectives of science education. This is a step in the right direction and one that will necessitate a re-examination of evaluative instruments and techniques currently in use. It is also heartening to note in many of the writings the idea that the scientist has many social responsibilities, one of which is to co-operate in science-education activities. A third idea frequently expressed by the authors is that science education must be part of all liberal education as well as the education of specialists.

For all persons who are concerned with science education, this volume will certainly stimulate thinking about ways to improve our present-day science education from kindergarten to the graduate school. What are the objectives of science teaching? How do individuals learn science? How should science teachers be trained? How can secondary-school science be improved? What about science in the elementary school? These and many more questions are discussed in this comprehensive survey.

HENRY C. MESSINGER
Allentown (Pennsylvania) School District

BURTON, DWIGHT L. *Literature Study in the High Schools.* New York: Henry Holt and Company, Inc., 1959. xii + 292 pp.

Five of Burton's twelve chapters deal directly with the various types of fiction that can produce in the adolescent the maturing reading sense that every English teacher looks for. Four other chapters treat literature in general and thus include indirectly some consideration of fiction. Evidently fiction is to be the staple of the adolescent's reading fare.

Burton's greatest contribution is his handling of the literature that deals most directly with the problems faced by adolescents. He brings up for serious consideration the accomplishments of representative junior novelists. Teacher-training courses might well explore the possible treasures of reading to be found among these writers. Equally valuable, of course, would be the discovery and subsequent uprooting of those titles that are unworthy of pupils' efforts and time. Too often there is a regrettably large difference between what the teacher recommends and what his pupils read. Burton's analysis of the junior novel is sound, criticizing the genre mainly because of its overly innocuous qualities. He enumerates the so-called taboos respected in the junior novel: "The 'seamy' side of life is generally avoided; erotic drives are ignored; smoking and drinking are seldom alluded to (adolescents, of course, never drink in the books); swearing and bad grammar are avoided . . ." (page 56).

With fiction taking the lion's share of the literature program, other types receive shorter treatment. The junior biography, lacking strong

entries, seems to be permanently relegated to the lives of sports figures, nurses, and historical heroes. The formal essay, which often makes a painful demand upon intellectual discipline and reasoning ability, is in rapid decline in the high-school program. Although no new approaches to the teaching of poetry are proffered, this section has value largely because the author includes summaries of useful *English Journal* articles. The chapter on teaching drama, written mainly by Robert A. Bennett, is also praiseworthy.

FRANK J. ZIDONIS

ZIRBES, LAURA. *Focus on Values in Elementary Education.* New York: G. P. Putnam's Sons, 1960. xiv + 238 pp. (Putnam Series in Education).

Laura Zirbes has followed her popular book, *Spurs to Creative Teaching,* with this "casebook" for pre-service and in-service use. As she says of herself in the Preface, "Few persons have had the opportunity to be so fully identified for so long with the problems of childhood education in America" (page vii). During this career, primarily at Ohio State University, she collected a number of case instances which she has used to focus the attention of teachers on educational values and thus to help reorient their thinking: "*Case instances* are like vignettes in which values are highlighted for focal consideration. They put *values* into concrete situational *contexts* which have realistic *bearings* that can be sensed, brought out, and shared in group discussion" (page 63). They do not prove anything, nor are they used as illustrations of principles.

A method for using these case instances, justification of the process, and an evaluation of the results are developed in the third chapter. The teacher-educator, whether working with pre-service or in-service teachers, will find this informative, helpful, and provocative. It seems, however, that students using the case instances should either omit this chapter or read it first to provide the rationale.

A series of case situations are cited in the first part of the book to illustrate the good things about today's schools. The author suggests that school personnel might be doing more to answer unqualified critics of education by making the public aware of such situations, particularly those that focus on the development of values in forward-looking elementary education. Contrasting examples representing misconceptions, inferences, and so on are used to define developmental teaching.

Chapter IV is a running account of three weeks of a summer school: ". . . those who use the accounts in this chapter as *vicarious* experience . . . can 'observe' each of the seven classes for two weeks, 'spend' an extra week with each of the three lower levels and also 'take in' the activities in the school health office and on the playground" (page 66). Values are identified for the reader and questions are included to facilitate use of the case instances. Extensive material of a similar nature but without the study helps is contained in the appendix. This comprises well over

half of the book and accounts for the author's definition of the work as a "casebook."

Other case instances illustrate and define quality teaching in elementary education. They develop the idea with which Miss Zirbes has become associated, perhaps most concisely stated in the sentence, "Optimal human fulfillment is the central purpose of education" (page 125).

A bibliography for reference and related reading is included. Instead of the conventional index, the book contains a "case finder," referring to various levels and features of the elementary-school program.

Miss Zirbes stresses the need for teachers to become personally involved in gaining insights and to aspire to more dynamic relationships with learners. The illustrations in the case instances ring true and should provide helpful material for those desiring to try this approach to teacher education.

HELEN WARDEBERG
Cornell University

DAVID, HENRY, editor. *Education and Manpower.* New York: Columbia University Press, 1960. xvi + 326 pp.

This volume is a collection of chapters from previous publications of the National Manpower Council at Columbia University, together with several essays written by members of the Council's staff, all dealing with the interrelationships between educational policy and the development and effective utilization of the nation's human resources. It contains a brief introductory section, six papers on various aspects of secondary education, two on vocational guidance, and four on higher education. In view of the increasingly prominent role of women in the world of work, it is noteworthy that two of the essays deal with the high school and post–high school education of girls.

There is considerable variation in quality among the selections. Chapter V, which is a summary of a conference discussion on "Secondary Education and the Development of Skill," is a hodgepodge of conflicting views with respect to virtually every issue confronting secondary education and with no attempt at analysis or evaluation. On the other hand, Chapters IX and X contain excellent analyses of the issues and problems in vocational guidance, and Chapters VII and VIII are valuable summaries of the development, current status, and issues in vocational education.

Among the high lights of the book are the thoughtful essays by Clarence Faust and Henry David on secondary and higher education, respectively (Chapters III and XIV), which stress the point that the concern for improving manpower resources does not imply the "vocationalization" of education. Mr. Faust eloquently pleads for "education" rather than "training" in the high schools and argues that the development of a capacity for reflection in students is the greatest contribution that the school system can make in preparing youngsters for vocations, citizenship, and

self-development. In a similar vein, Mr. David warns that higher education must not "confuse the economy with society" (page 297). That is, the need is not only for the preparation of highly specialized manpower, but for the development of the breadth of understanding and wisdom necessary to cope with *all* the problems—social, political, economic, as well as technological—of a rapidly changing world.

The fact that the volume is a collection of excerpts from other publications, most of which appeared in the first half of the last decade, is the source of both its virtues and its weaknesses. On the one hand, a useful service has been performed by bringing into a single volume those portions of the Council's studies that focus on the role of education in manpower development and utilization. On the other hand, the diversity of sources contributes to a lack of unity and also accounts for some repetition among the various selections. Also one wishes that the up-to-date data on such matters as school enrollment had been incorporated into the text rather than having been presented in footnotes at the end of the volume. Finally, in view of the nature of the manpower problems that are most plaguing at the moment, it is unfortunate that there is no chapter exploring the possible role of educational and training institutions in mitigating technological unemployment. Despite these limitations, however, the book is worthy of the attention of all who are interested in manpower problems and educational policy.

HERBERT S. PARNES

PETERS, HERMAN J., AND FARWELL, GAIL F. *Guidance: a Developmental Approach*. Chicago: Rand McNally and Company, 1959. x + 508 pp.

The authors intended this book to be used as "an introductory text for counselor preparation programs and as a useful resource for the school staff interested in in-service education of teachers" (Preface, page [v]). They have departed considerably from the usual "technique" emphasis of beginning guidance textbooks and have instead stressed a developmental approach with strong mental-health overtones. They proceed on the premise that a mentally hygienic atmosphere within the school is essential for a guidance program. Because communication and good human relations are basic ingredients in mental health, much of the book is directed toward examining the forces with which children interact.

The relationships between the youngster and the teacher, parent, counselor, principal, and school psychologist are explored and defined. The tools which may be used to aid child development are clearly presented. The relationship of each guidance service to the complete guidance program and the contributions of each to the achievement of a mentally healthy atmosphere are explicitly and purposefully explored.

The book is nontechnical, easy to understand, informative, up-to-date, and practical. It not only provides a firm foundation on which to build further competencies, but also creates in the reader a desire to do so. It is

not without its weaknesses, however. The writing is sometimes dull and frequently redundant. The authors on occasion belabor a point by restating it several times; at times they approach a topic in a very indirect manner, perhaps an attribute rather than a criticism. On the other hand, they do not recapitulate when, by doing so, they might have strengthened certain parts. There seems to be a need for a final chapter to pull together the aspects of the guidance program appearing in earlier sections, a chapter which clearly delineates the roles of the school counselor and the unique contribution he can make to the guidance team.

As a first effort for newcomers to the publishing field, Peters and Farwell have produced a significant contribution. They are to be commended particularly for their emphasis on learning and mental-health principles in the development of a sound guidance program.

L. M. DeRidder
University of Tennessee

The Effects of Television Teaching

[*Continued from page 145*]

The teacher's response may be affected even by his participation in the program. It is possible that his initial reaction will be modified by extensive participation: it may be changed entirely or intensified by the experience.

These, then, are some of the areas that need to be examined if we are to know the effect of direct television teaching on the classroom teacher. And we must know this if we are to understand the effect of television on the educational process.

The Editor Retires

[*Continued from page 162*]

research that he personally wishes to pursue. He will now have the opportunity to concentrate his energy on a study of the Muskingum Watershed Conservancy District, which has long been postponed because of other pressing commitments.

His colleagues congratulate "R. H. E." on a job well done and wish him many years of fruitful and satisfying work.

S. L.

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